Fig.1

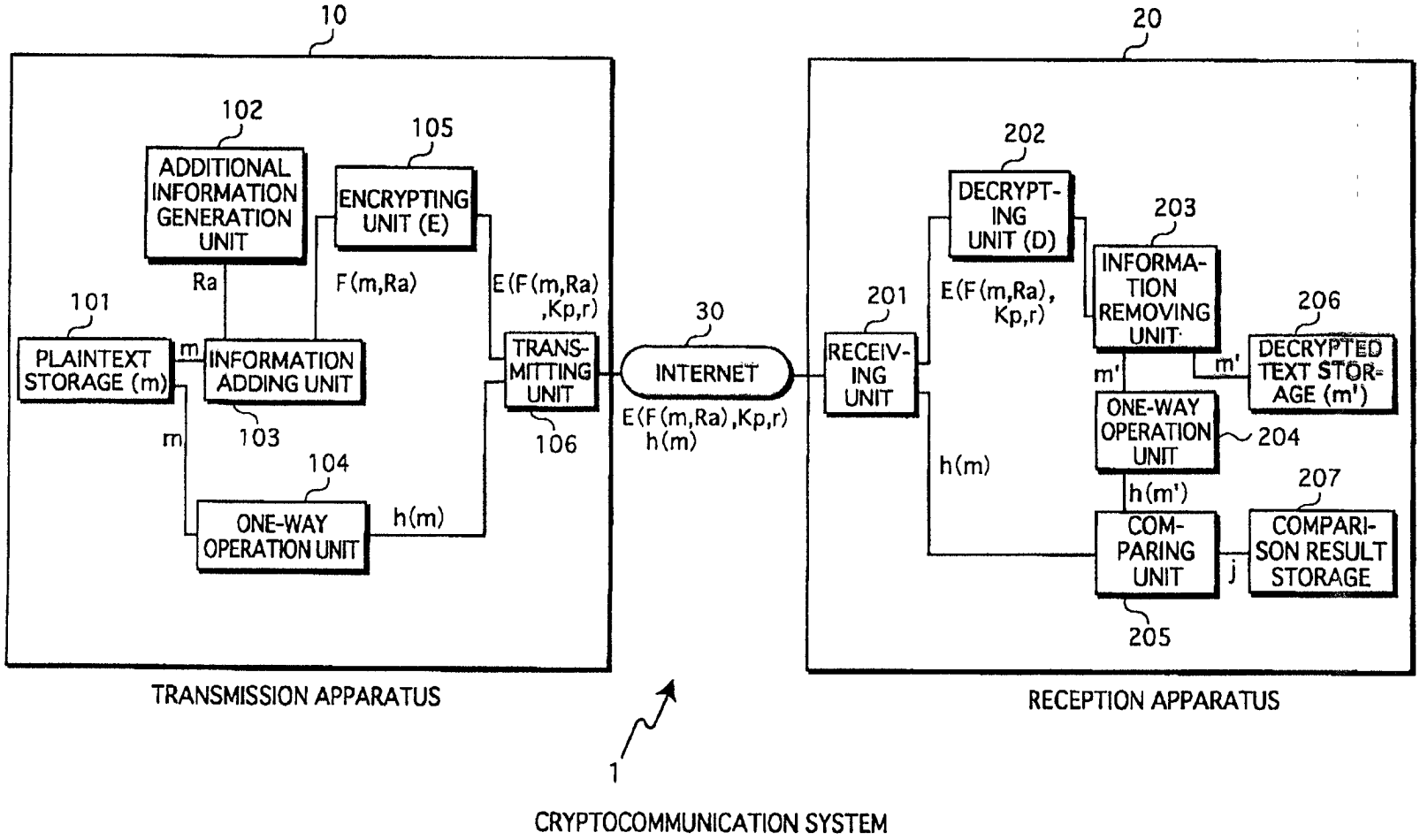
10
102
ADDITIONAL INFORMATION GENERATION UNIT
105
ENCRYPTING UNIT (E)
Ra
F(m,Ra)
E(F(m,Ra),Kp,r)
101
PLAINTEXT STORAGE (m)
m
INFORMATION ADDING UNIT
103
TRANSMITTING UNIT
106
m
104
ONE-WAY OPERATION UNIT
h(m)
30
INTERNET
E(F(m,Ra),Kp,r)
h(m)
20
201
RECEIVING UNIT
202
DECRYPTING UNIT (D)
E(F(m,Ra),Kp,r)
203
INFORMATION REMOVING UNIT
m'
206
DECRYPTED TEXT STORAGE (m')
m'
ONE-WAY OPERATION UNIT
204
h(m)
h(m')
207
COMPARING UNIT
j
COMPARISON RESULT STORAGE
205
TRANSMISSION APPARATUS
RECEPTION APPARATUS
1
CRYPTOCOMMUNICATION SYSTEM

Fig.2

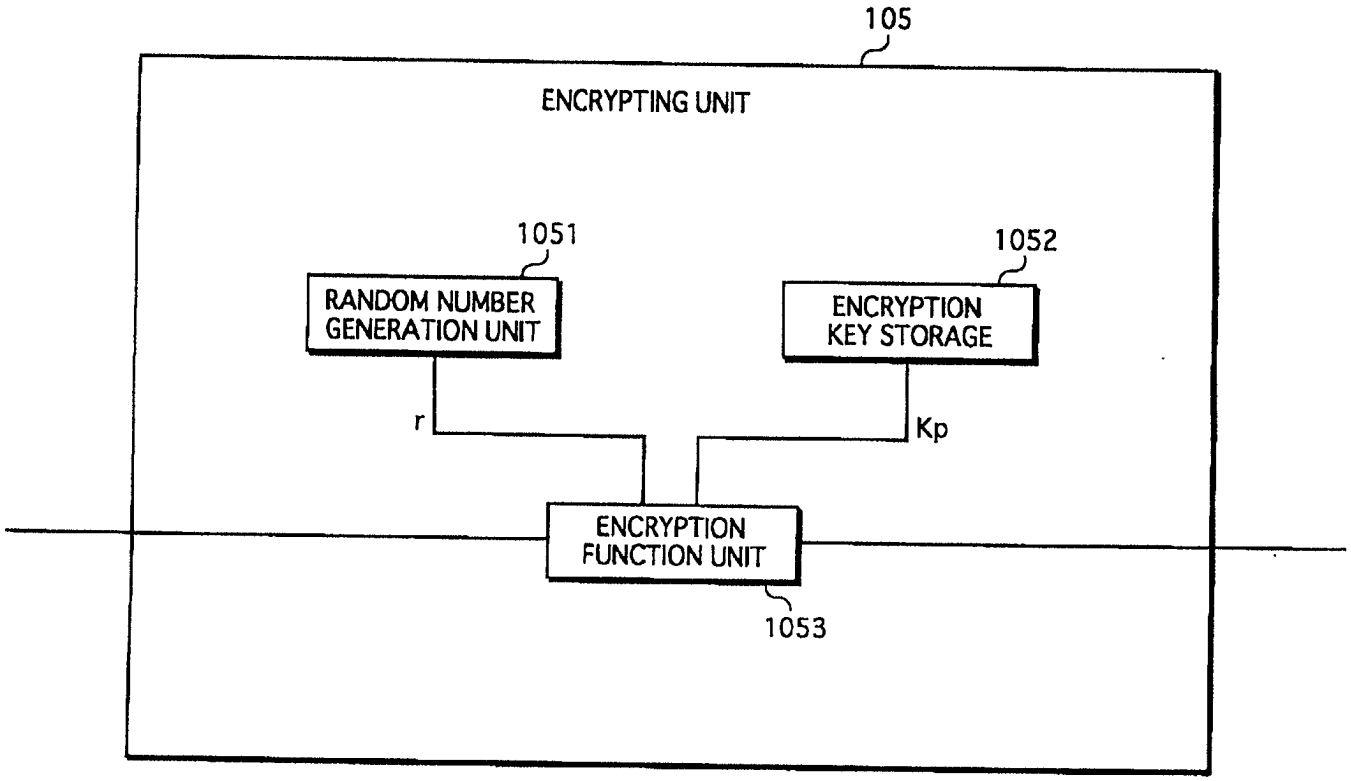
105
ENCRYPTING UNIT
1051
RANDOM NUMBER GENERATION UNIT
1052
ENCRYPTION KEY STORAGE
r
Kp
ENCRYPTION FUNCTION UNIT
1053

Fig.3

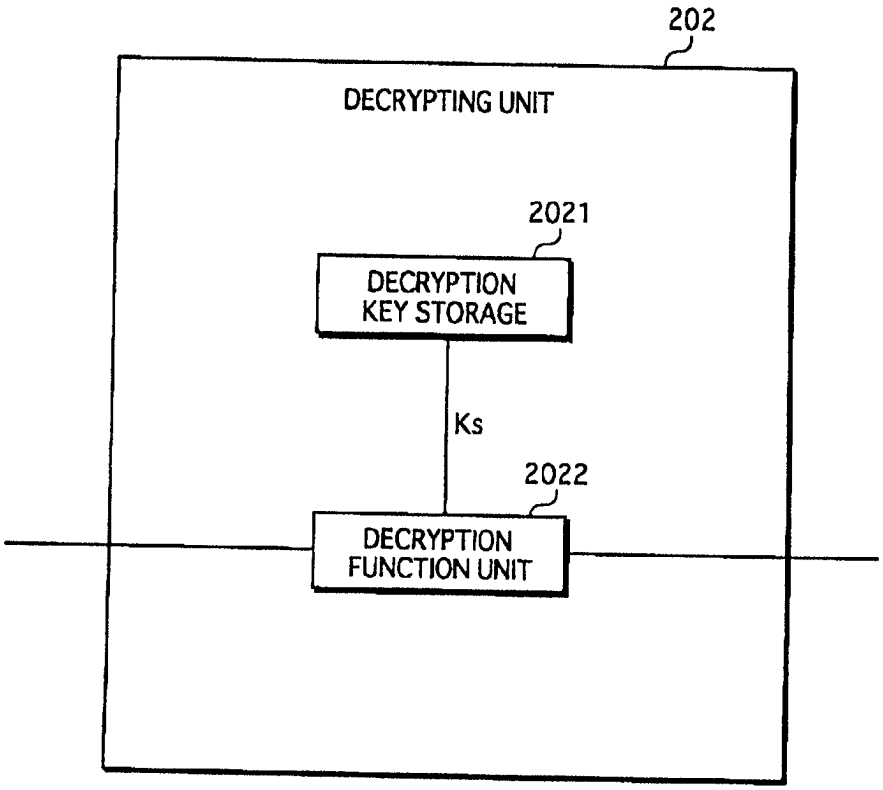
202
DECRYPTING UNIT
2021
DECRYPTION KEY STORAGE
Ks
2022
DECRYPTION FUNCTION UNIT

FIG.4

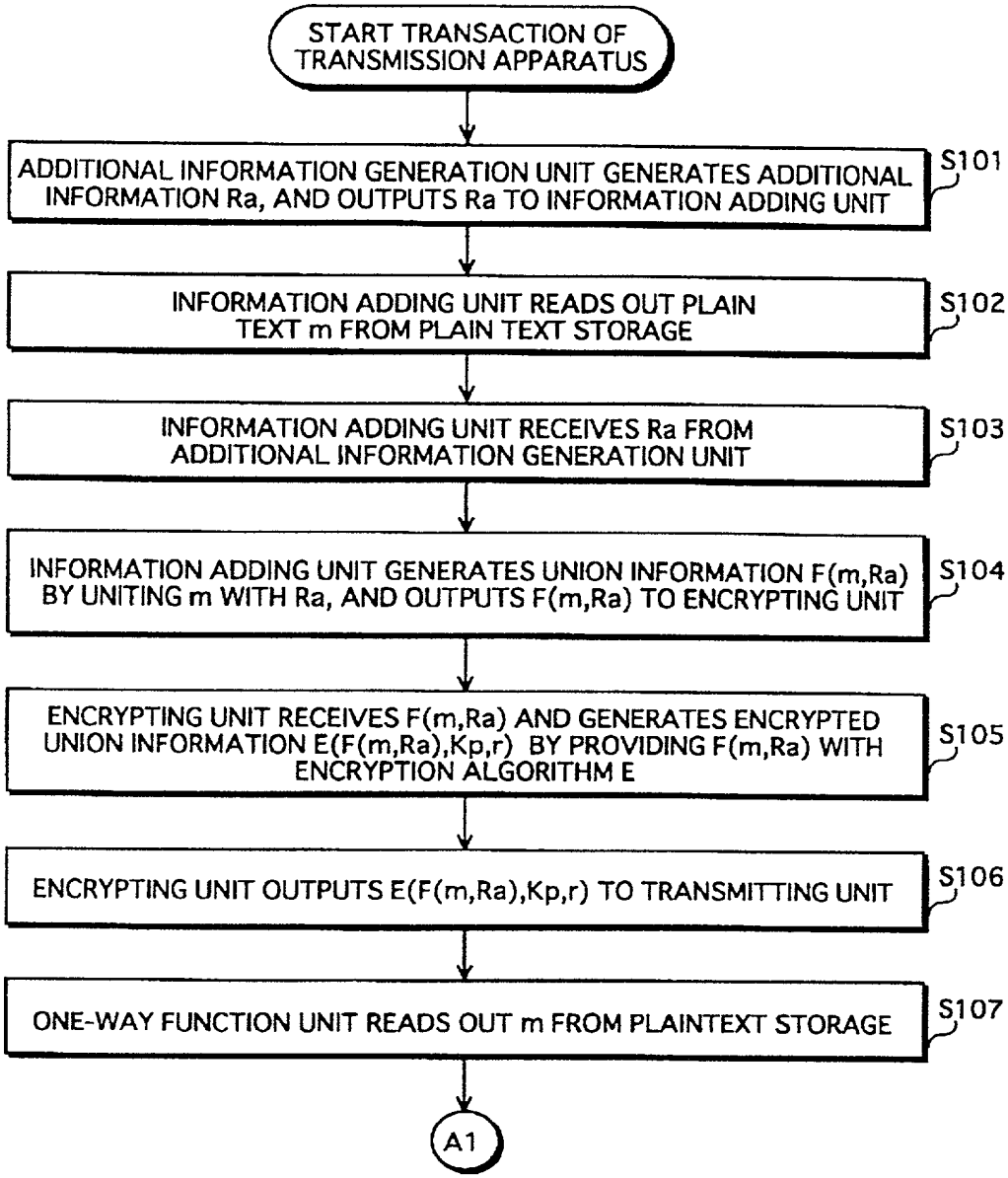
START TRANSACTION OF TRANSMISSION APPARATUS
ADDITIONAL INFORMATION GENERATION UNIT GENERATES ADDITIONAL INFORMATION Ra, AND OUTPUTS Ra TO INFORMATION ADDING UNIT
S101
INFORMATION ADDING UNIT READS OUT PLAIN TEXT m FROM PLAIN TEXT STORAGE
S102
INFORMATION ADDING UNIT RECEIVES Ra FROM ADDITIONAL INFORMATION GENERATION UNIT
S103
INFORMATION ADDING UNIT GENERATES UNION INFORMATION F(m,Ra) BY UNITING m WITH Ra, AND OUTPUTS F(m,Ra) TO ENCRYPTING UNIT
S104
ENCRYPTING UNIT RECEIVES F(m,Ra) AND GENERATES ENCRYPTED UNION INFORMATION E(F(m,Ra),Kp,r) BY PROVIDING F(m,Ra) WITH ENCRYPTION ALGORITHM E
S105
ENCRYPTING UNIT OUTPUTS E(F(m,Ra),Kp,r) TO TRANSMITTING UNIT
S106
ONE-WAY FUNCTION UNIT READS OUT m FROM PLAINTEXT STORAGE
S107
A1

Fig.5

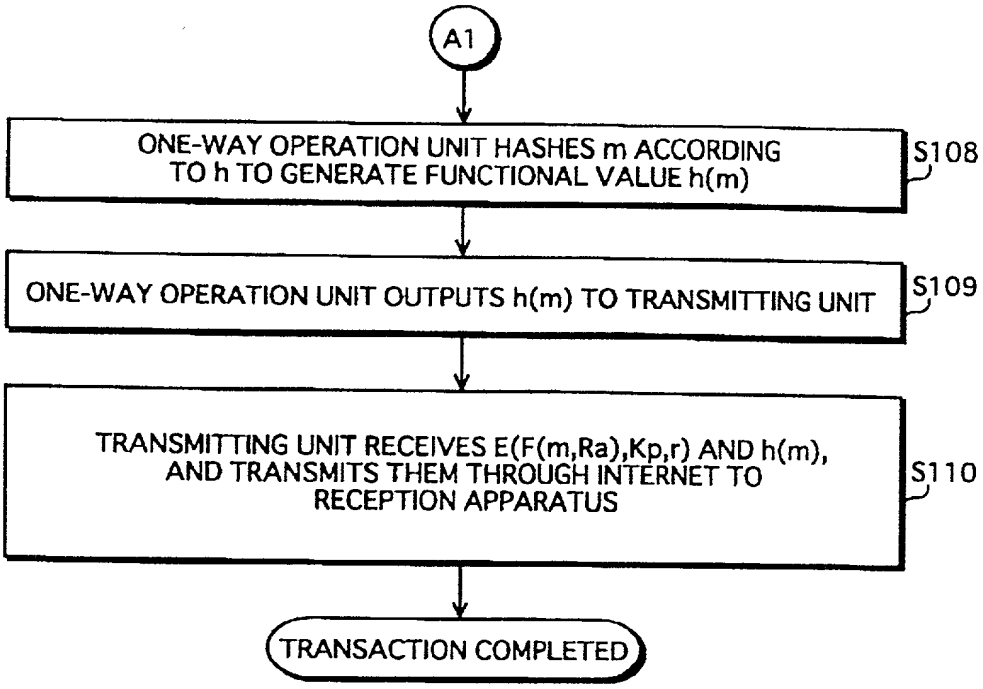
A1
ONE-WAY OPERATION UNIT HASHES m ACCORDING TO h TO GENERATE FUNCTIONAL VALUE h(m)
S108
ONE-WAY OPERATION UNIT OUTPUTS h(m) TO TRANSMITTING UNIT
S109
TRANSMITTING UNIT RECEIVES E(F(m,Ra),Kp,r) AND h(m), AND TRANSMITS THEM THROUGH INTERNET TO RECEPTION APPARATUS
S110
TRANSACTION COMPLETED

FIG.6

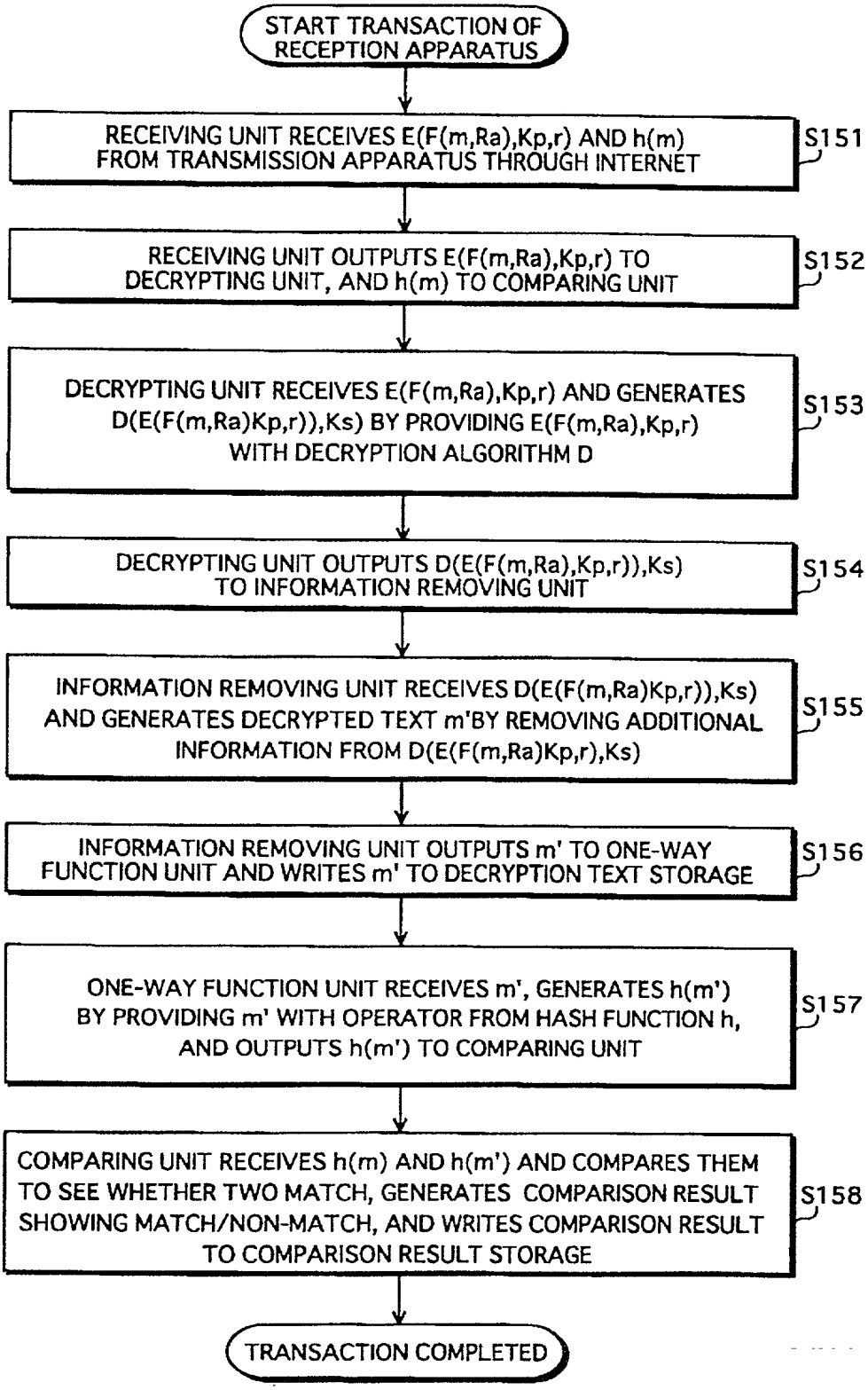
START TRANSACTION OF RECEPTION APPARATUS
RECEIVING UNIT RECEIVES E(F(m,Ra),Kp,r) AND h(m) FROM TRANSMISSION APPARATUS THROUGH INTERNET
S151
RECEIVING UNIT OUTPUTS E(F(m,Ra),Kp,r) TO DECRYPTING UNIT, AND h(m) TO COMPARING UNIT
S152
DECRYPTING UNIT RECEIVES E(F(m,Ra),Kp,r) AND GENERATES D(E(F(m,Ra)Kp,r)),Ks) BY PROVIDING E(F(m,Ra),Kp,r) WITH DECRYPTION ALGORITHM D
S153
DECRYPTING UNIT OUTPUTS D(E(F(m,Ra),Kp,r)),Ks) TO INFORMATION REMOVING UNIT
S154
INFORMATION REMOVING UNIT RECEIVES D(E(F(m,Ra)Kp,r)),Ks) AND GENERATES DECRYPTED TEXT m'BY REMOVING ADDITIONAL INFORMATION FROM D(E(F(m,Ra)Kp,r),Ks)
S155
INFORMATION REMOVING UNIT OUTPUTS m' TO ONE-WAY FUNCTION UNIT AND WRITES m' TO DECRYPTION TEXT STORAGE
S156
ONE-WAY FUNCTION UNIT RECEIVES m', GENERATES h(m') BY PROVIDING m' WITH OPERATOR FROM HASH FUNCTION h, AND OUTPUTS h(m') TO COMPARING UNIT
S157
COMPARING UNIT RECEIVES h(m) AND h(m') AND COMPARES THEM TO SEE WHETHER TWO MATCH, GENERATES COMPARISON RESULT SHOWING MATCH/NON-MATCH, AND WRITES COMPARISON RESULT TO COMPARISON RESULT STORAGE
S158
TRANSACTION COMPLETED

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Fig.7

CONVERSION TABLE

INPUT VALUE m	OUTPUT VALUE Tab[Ra](m)
0	122
1	39
•	•
•	•
•	•
•	•
•	•
255	91

Fig.8

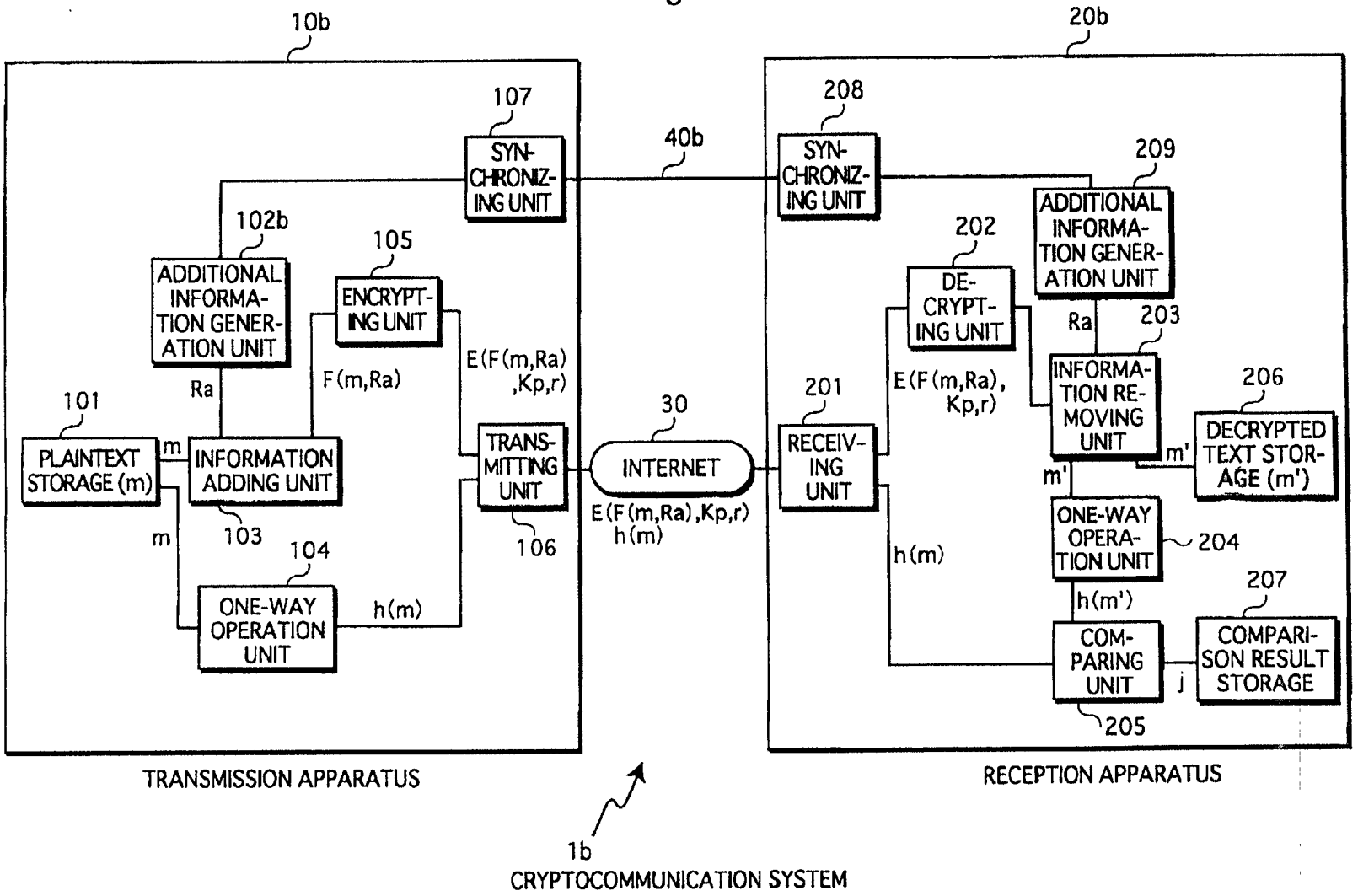
10b
20b
107
SYN-CHRONIZ-ING UNIT
40b
208
SYN-CHRONIZ-ING UNIT
209
ADDITIONAL INFORMA-TION GENER-ATION UNIT
102b
ADDITIONAL INFORMA-TION GENER-ATION UNIT
105
ENCRYPT-ING UNIT
202
DE-CRYPT-ING UNIT
Ra
203
INFORMA-TION RE-MOVING UNIT
206
DECRYPTED TEXT STOR-AGE (m')
E(F(m,Ra),Kp,r)
F(m,Ra)
101
PLAINTEXT STORAGE (m)
m
INFORMATION ADDING UNIT
TRANS-MITTING UNIT
30
INTERNET
201
RECEIV-ING UNIT
E(F(m,Ra),Kp,r)
h(m)
m'
ONE-WAY OPERA-TION UNIT
204
103
104
106
h(m)
ONE-WAY OPERATION UNIT
h(m')
207
COM-PARING UNIT
COMPARI-SON RESULT STORAGE
j
205
TRANSMISSION APPARATUS
RECEPTION APPARATUS
1b
CRYPTOCOMMUNICATION SYSTEM

Fig.9

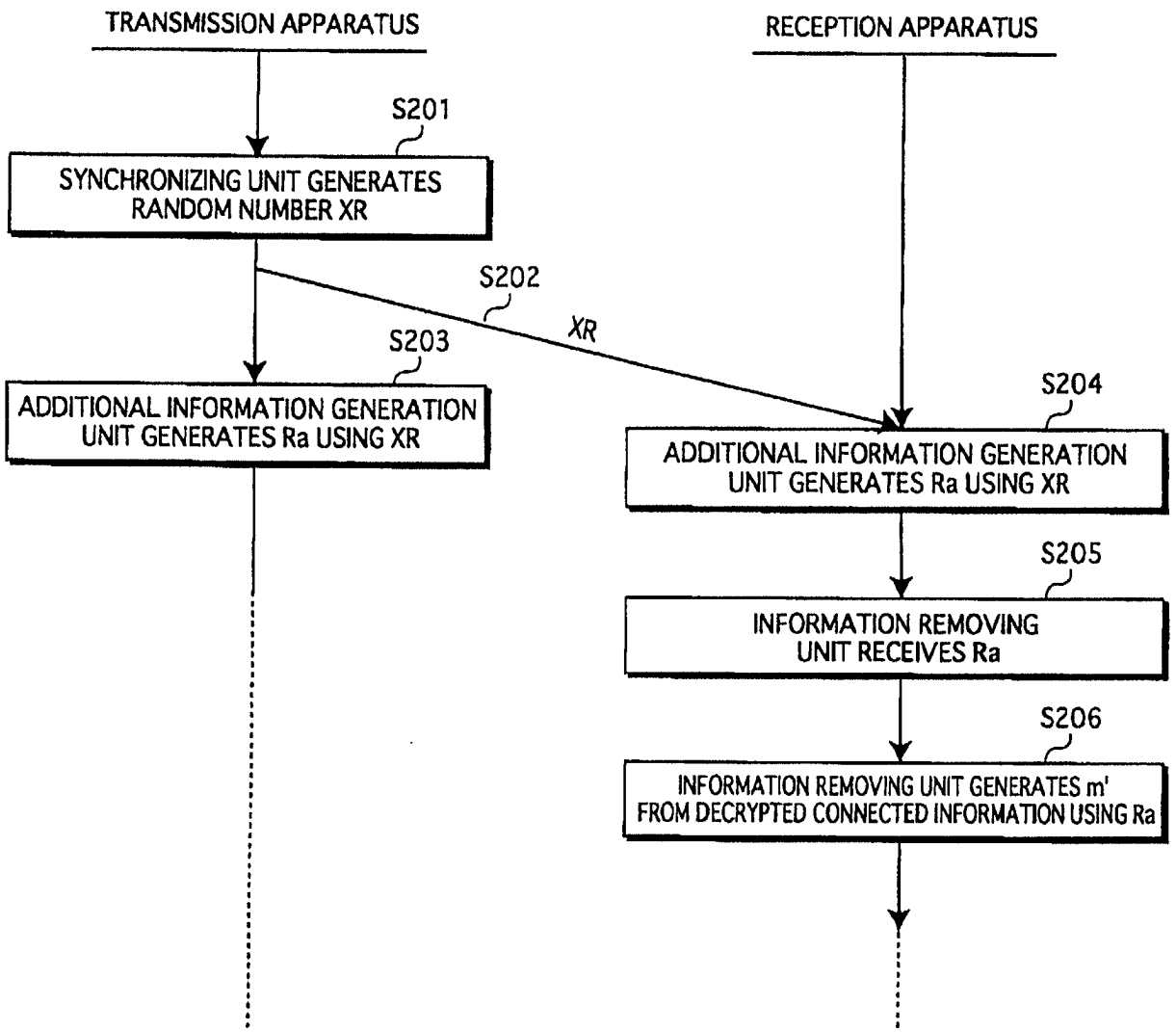
TRANSMISSION APPARATUS
RECEPTION APPARATUS
S201
SYNCHRONIZING UNIT GENERATES RANDOM NUMBER XR
S202
XR
S203
ADDITIONAL INFORMATION GENERATION UNIT GENERATES Ra USING XR
S204
ADDITIONAL INFORMATION GENERATION UNIT GENERATES Ra USING XR
S205
INFORMATION REMOVING UNIT RECEIVES Ra
S206
INFORMATION REMOVING UNIT GENERATES m' FROM DECRYPTED CONNECTED INFORMATION USING Ra

Fig.10

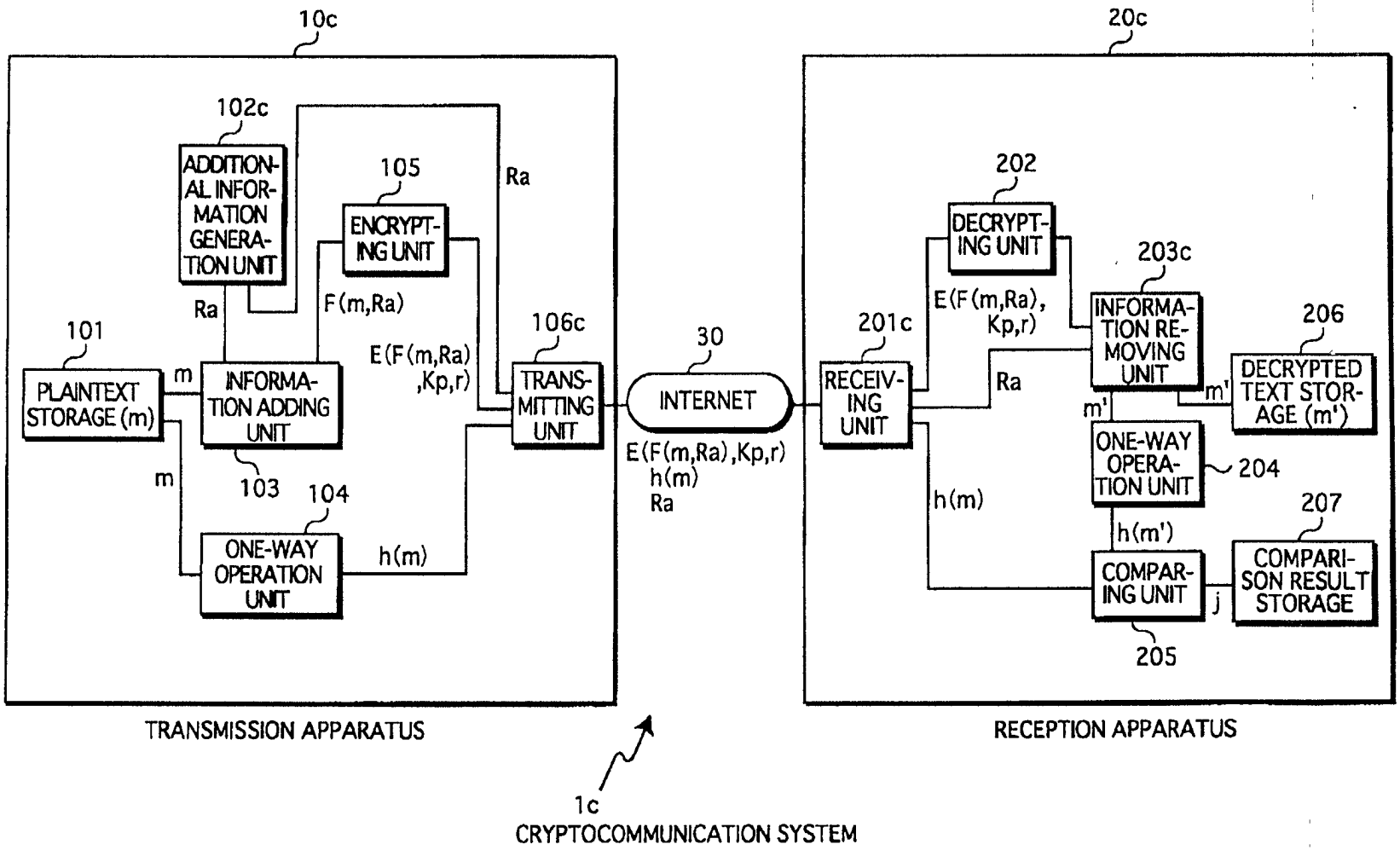
10c
102c
ADDITIONAL INFORMATION GENERATION UNIT
105
ENCRYPTING UNIT
Ra
F(m,Ra)
101
PLAINTEXT STORAGE (m)
m
INFORMATION ADDING UNIT
E(F(m,Ra),Kp,r)
106c
TRANSMITTING UNIT
103
104
ONE-WAY OPERATION UNIT
h(m)
30
INTERNET
E(F(m,Ra),Kp,r)
h(m)
Ra
TRANSMISSION APPARATUS
20c
202
DECRYPTING UNIT
E(F(m,Ra),Kp,r)
201c
RECEIVING UNIT
Ra
h(m)
203c
INFORMATION REMOVING UNIT
m'
206
DECRYPTED TEXT STORAGE (m')
ONE-WAY OPERATION UNIT
204
h(m')
207
COMPARING UNIT
j
COMPARISON RESULT STORAGE
205
RECEPTION APPARATUS
1c
CRYPTOCOMMUNICATION SYSTEM

Fig.11

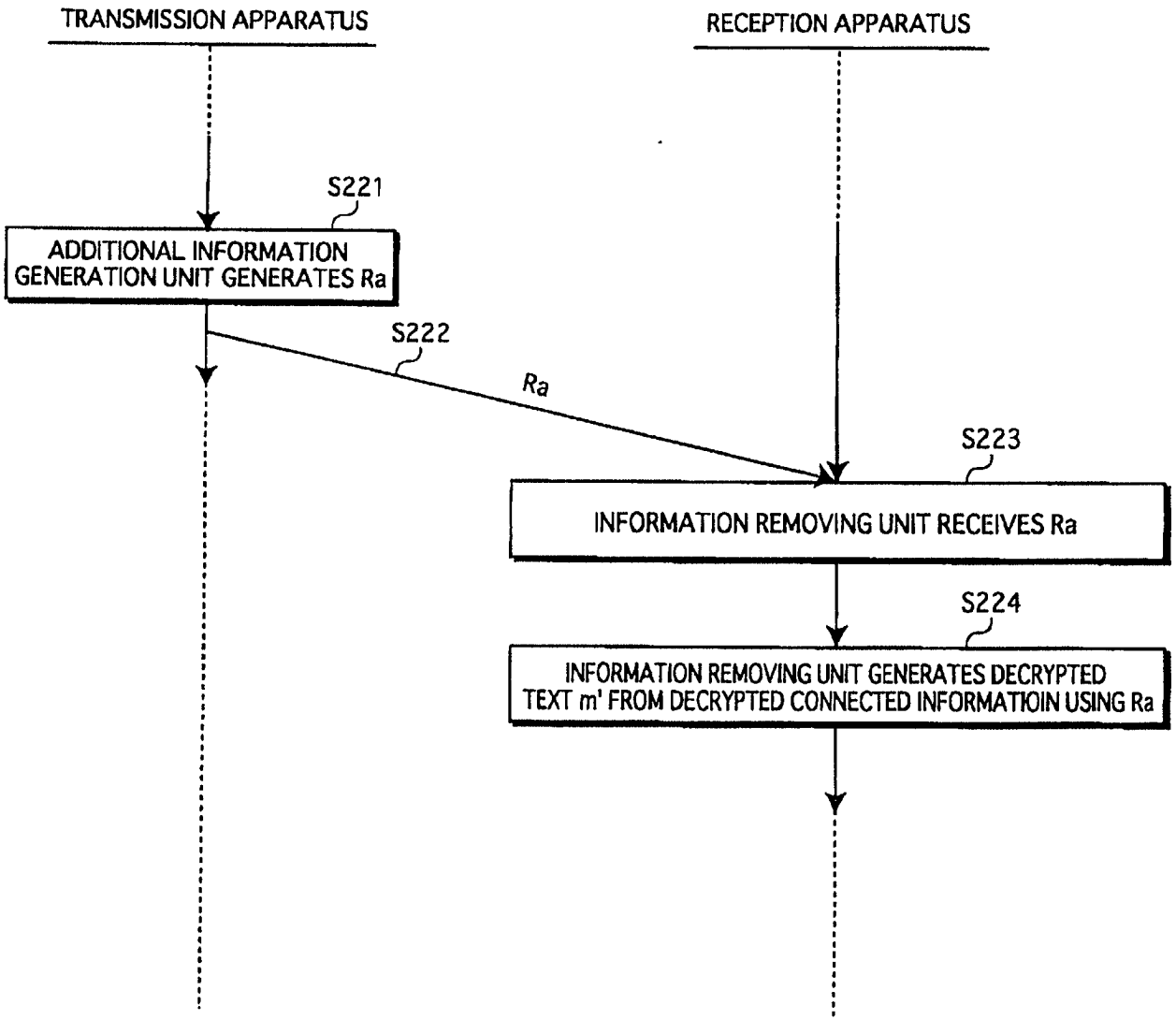
TRANSMISSION APPARATUS
RECEPTION APPARATUS
S221
ADDITIONAL INFORMATION GENERATION UNIT GENERATES Ra
S222
Ra
S223
INFORMATION REMOVING UNIT RECEIVES Ra
S224
INFORMATION REMOVING UNIT GENERATES DECRYPTED TEXT m' FROM DECRYPTED CONNECTED INFORMATIOIN USING Ra

Fig.12

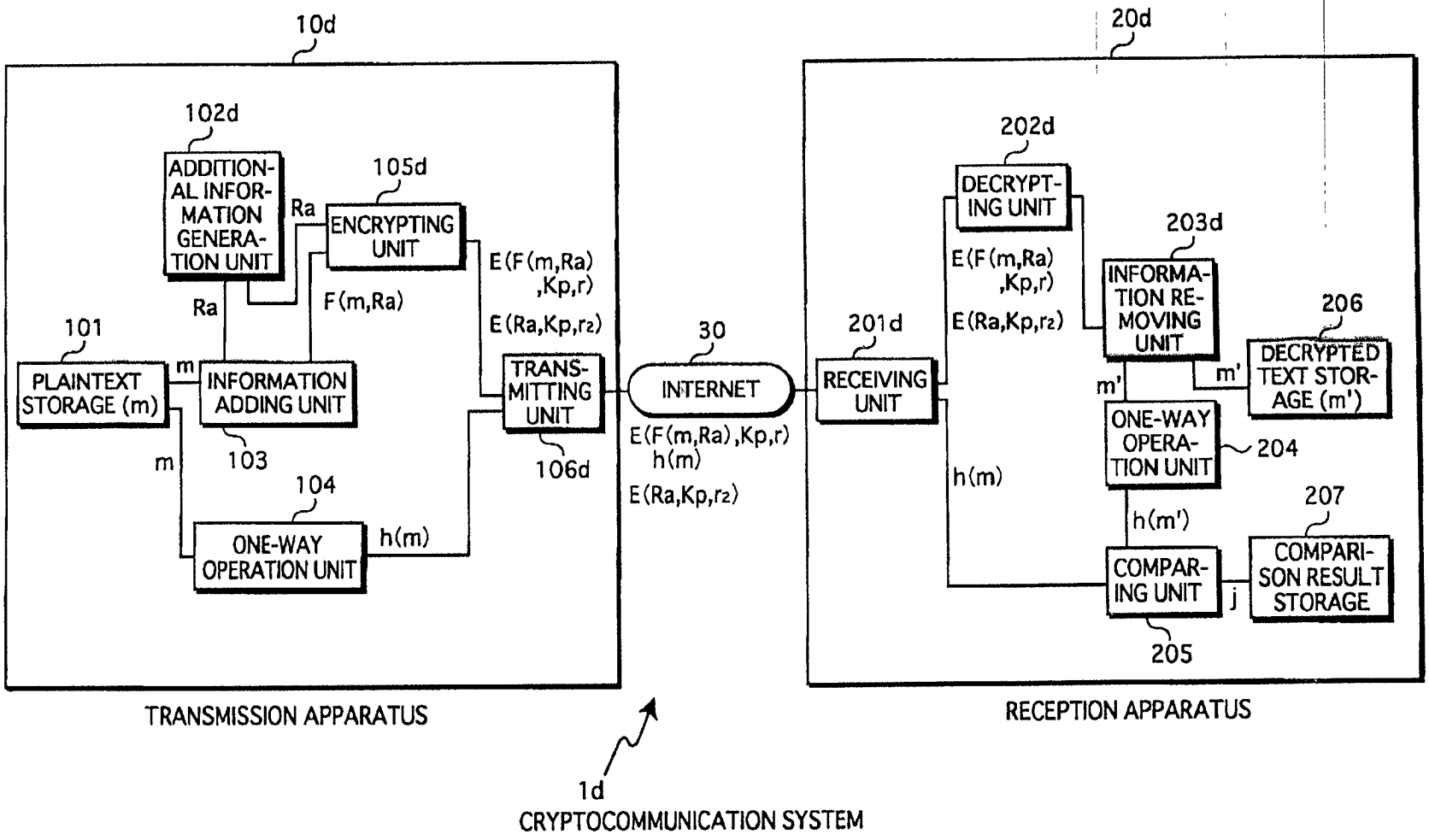
10d
102d
ADDITIONAL INFORMATION GENERATION UNIT
105d
ENCRYPTING UNIT
Ra
Ra
F(m,Ra)
E(F(m,Ra),Kp,r)
E(Ra,Kp,r2)
101
PLAINTEXT STORAGE (m)
m
INFORMATION ADDING UNIT
103
m
104
ONE-WAY OPERATION UNIT
h(m)
TRANSMITTING UNIT
106d
30
INTERNET
E(F(m,Ra),Kp,r)
h(m)
E(Ra,Kp,r2)
20d
201d
RECEIVING UNIT
202d
DECRYPTING UNIT
E(F(m,Ra),Kp,r)
E(Ra,Kp,r2)
h(m)
203d
INFORMATION REMOVING UNIT
m'
m'
206
DECRYPTED TEXT STORAGE (m')
ONE-WAY OPERATION UNIT
204
h(m')
207
COMPARING UNIT
j
COMPARISON RESULT STORAGE
205
TRANSMISSION APPARATUS
RECEPTION APPARATUS
1d
CRYPTOCOMMUNICATION SYSTEM

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Fig.13

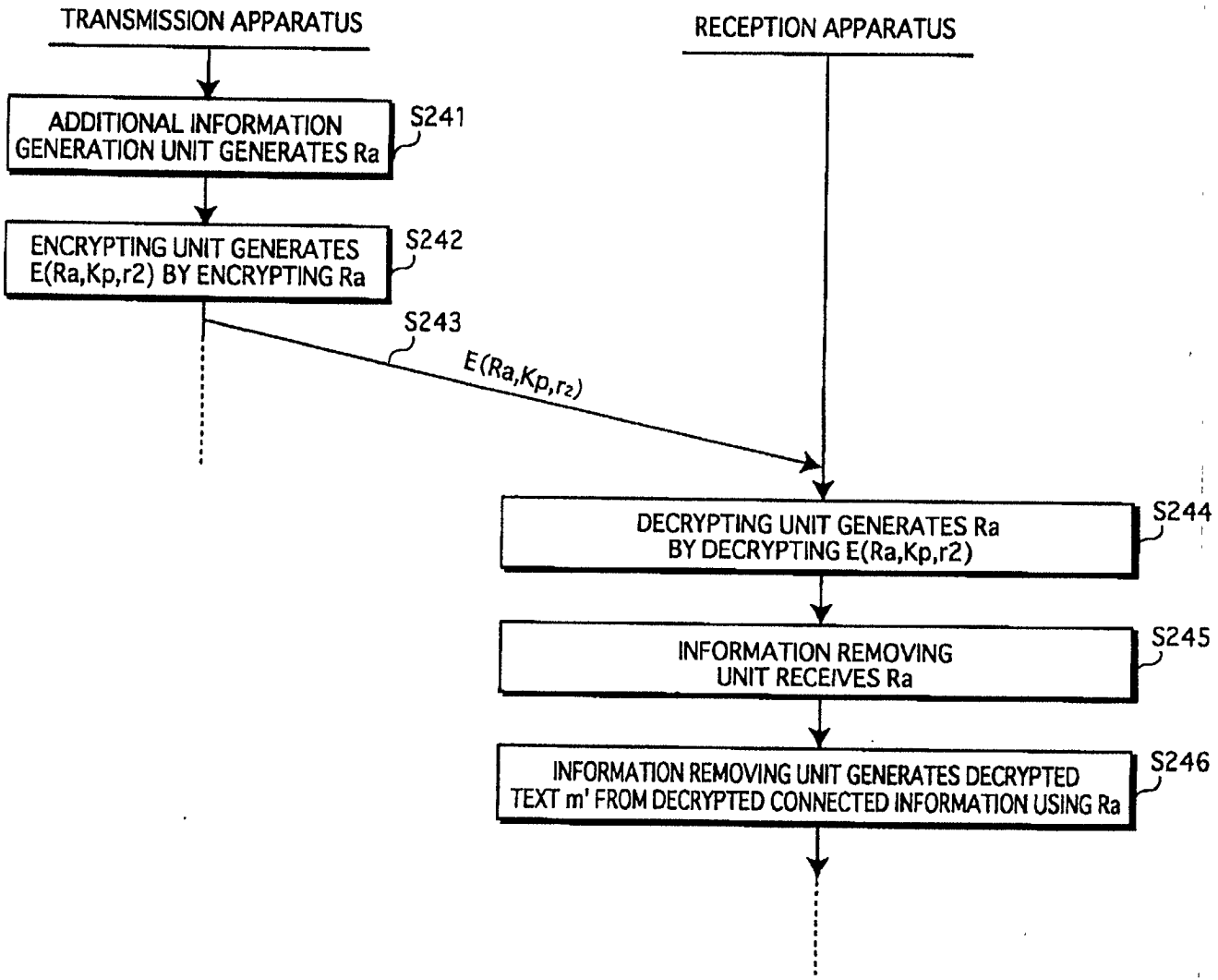

Fig.14

ADDITIONAL INFORMATION / INVERTIBLE CONVERSION F(m,Ra)	(1)Ra: RANDOM NUMBER	(2)Ra: TIME STAMP	(3)Ra: COUNTER
(1) m‖Ra	CRYPTOCOMMUNICATION SYSTEM 1,1b~1d		
(2) m⊕Ra	CRYPTOCOMMUNICATION SYSTEM 1b~1d		
(3) m+Ra			
(4) m×Ra mod p			
(5) BitPerm[Ra](m)			
(6) Tab[Ra](m)			